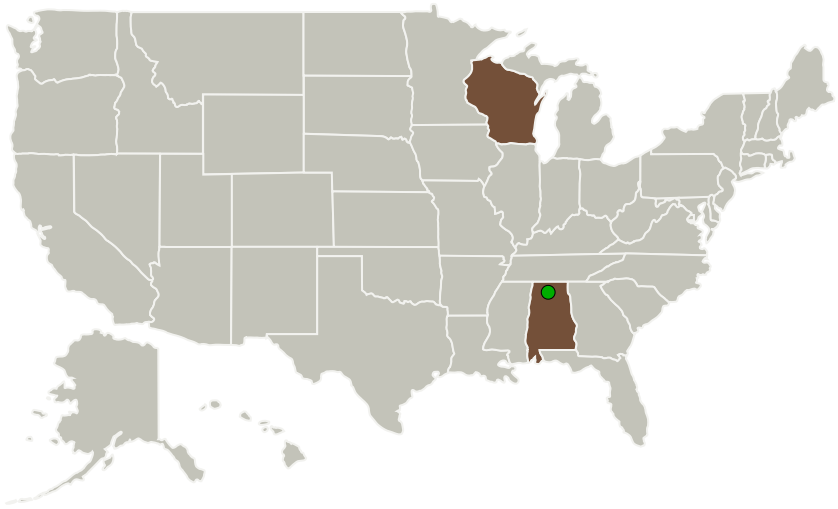
Hydrogen Generator by Methane Pyrolysis with Carbon Capture, Phase I

Completed Technology Project (2011 - 2011)

Project Introduction

ORBITEC proposes to develop, fabricate, and test a system to provide 99.999% hydrogen by efficiently performing methane pyrolysis. The system has three unique features: (1) the methane pyrolysis reactor that does not rely on high single-pass efficiencies (which will make the system robust), (2) it incorporates batch processing modes, cleaning cycles, and a carbon capture device (which makes it reusable), and (3) it uses palladium membrane technology to separate the hydrogen from the methane stream (which makes the H2 effluent very pure). ORBITEC proposes the Hydrogen Generator by Methane Pyrolysis with Carbon Capture, herein referred to as the H2Gen system. During Phase 1 of this effort, ORBITEC will test the four major components of the system: the methane pyrolysis reactor, the carbon removal mechanism, the carbon capture device, and the hydrogen remover. The performance and efficiency of each component will be tested and characterized. Phase 2 will expand upon these efforts and a full-scale brassboard prototype will be developed and built, maintaining the efficiencies of the system while optimizing overall mass and volume.

Primary U.S. Work Locations and Key Partners



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Organizations Performing Work	Role	Type	Location
Sierra Nevada Corporation(SNC)	Lead Organization	Industry Women-Owned Small Business (WOSB)	Sparks, Nevada
Marshall Space Flight Center(MSFC)	Supporting Organization	NASA Center	Huntsville, Alabama

Primary U.S. Work Locations	
Alabama	Wisconsin

Project Transitions

February 2011: Project Start

September 2011: Closed out

Closeout Documentation:

- Final Summary Chart*(https://techport.nasa.gov/file/138619)*

Organizational Responsibility

Responsible Mission Directorate:

Space Technology Mission Directorate (STMD)

Lead Organization:

Sierra Nevada Corporation (SNC)

Responsible Program:

Small Business Innovation Research/Small Business Tech Transfer

Project Management

Program Director:

Jason L Kessler

Program Manager:

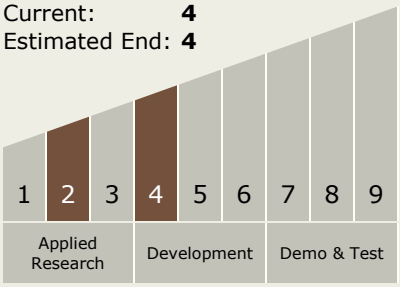
Carlos Torrez

Principal Investigator:

Jeff R Johnson

Technology Maturity (TRL)

Start: **2**
Current: **4**
Estimated End: **4**



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Technology Areas

Primary:

- TX06 Human Health, Life Support, and Habitation Systems
  - TX06.1 Environmental Control & Life Support Systems (ECLSS) and Habitation Systems
    - TX06.1.3 Waste Management

Target Destinations

The Sun, Earth, The Moon, Mars, Others Inside the Solar System, Outside the Solar System